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THE NETHERLAND

BY FAX (10 pages)

May 3, 2005

Our Case E-2291/04

For the kind attention of A. DUQUENOY - Authorized Officer

Dear Sirs,

RE: International Application No. PCT/EP2004/051597
in the name of PERCIVALLE SPECIAL CONVERTING S.A.S. ...

This is in response to the written opinion of the International Searching Authority concerning the above-identified International Application.

Please find enclosed herewith new description pages 2-3, which contain added paragraph discussing the cited and more relevant prior art, and new pages 15-19, which contain an amended set of claims 1 to 20 replacing the originally filed claims.

In the new set of claims:

- main claim 1 includes original claim 1 and further limitations taken from original dependent claims 14 and 16 and from the description at page 8, lines 12-17;
- present claims 2-11 correspond to unamended original claims 2-11;
- present claims 12-14 are newly drafted claims (supported by the original description at page 8, lines 8-10; at page 8, lines 17-18; at page 6, lines 6-8 and 15-19 respectively);
- present claims 15-20 correspond to original claims 17-22, renumbered without substantive amendments.

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All the amendments are fully supported by the application as originally filed (description and/or claims), and no new matter has therefore been added by amendment.

Amended claim 1, in view of the amendments, is novel and inventive over the cited prior art.

In fact, according to amended claim 1, the device of the invention is characterized in that:

- the doctor 24 is mounted to lie flat, and
- the doctor carrier 25 comprises a rotating support 27 and a slide 28.

None of the cited references discloses a doctor carrier which comprises both a rocking support and a slide, so as the doctor is both slidable and rotatable with respect to the casing. As discussed at page 8, line 11 to page 9, line 7 of the application, this combination of movements allows both the doctor position and the pressure exerted by the doctor to be accurately and effectively adjusted.

It should also be appreciated that the features now claimed in the characterizing portion of claim 1, by providing for both rotating and translating the doctor, allow both the doctoring position and angle to be adjusted, and so permit use of print cylinders having different developments i.e. diameters. This is a great advantage from an industrial viewpoint, because a printing machine can be equipped with a single unit according to the invention and can operate with any kind of print cylinders, without requiring substitution of other components.

Cited references do not disclose any sort of adjusting mechanism which permits the same result, as now discussed in amended page 2 (with specific reference to D1 and D7); the advantages of the invention in view of the admitted prior art are discussed in the amended paragraph of new page 3 (based on the original description, pages 8-9 bridging paragraph; and page 14, lines 4-5)

The definition of "flat doctor" is well recognized in the technical field the invention pertains to and it is however fully explained at page 8, lines 8-10. A "flat doctor" is a doctor which (resting on the lateral surface of the associated print cylinder along a doctor line), forms an acute angle with the plane tangent to the print cylinder lateral surface along the doctor line, on the ink feed side. This is also claimed by new claim 12.

Only cited references D6 and D7 disclose flat doctors, but not in combination with the other features of claim 1, in particular with an adjusting mechanism allowing both a sliding movement and a rotation of the doctor blade.

The skilled person, facing the objective problem to improve the effectiveness of a flat doctor device as shown in D6, D7, would not be instructed by any prior art documents to include an adjusting mechanism as presently claimed, since a similar mechanism is not disclosed by any cited references.

The claimed solution is therefore neither taught nor even suggested by the cited references, either alone or in combination with one another.

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Dependent claims, being appended to claim 1, are also new and inventive over the admitted prior art.

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Moreover, it should also be appreciated that dependent claims contain additional features of the invention which are not disclosed in the prior art, nor concern only obvious constructional developments. In particular:

- present claim 11 recites sealing means (32, 33) between the doctor assembly (14) and the casing and extending continuously along the whole width of the doctor assembly for engaging an edge (13b) of the casing. Prior art references do not disclose similar sealing means, because in the known devices the doctor is not movable with respect to the casing, or the doctor is otherwise connected to the casing; according to the invention, since the doctor carrier slides and rotates with respect to the casing, there is an actual need to ensure a sealed connection between the casing and the doctor assembly along the whole width of the doctor assembly;

- present claim 14 recites an inking roller (16) housed inside the inking chamber (15) for pressing the ink against the print cylinder. An inking roller housed inside the inking chamber is not disclosed in any cited references; the use of this roller ensure optimum inking of the print cylinder;

- present claims 17 to 20 relates to a rotogravure print and spread assembly including the doctor/inking unit of the preceding claims; in addition to the distinguishing features of the inking/doctor unit, the assembly is further characterized by comprising actuating means (4) for adjusting the relative position of the inking/doctor unit (3) with respect to the print cylinder (2). The assembly specifically comprises:

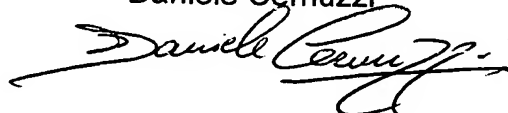
- rotary actuating means (40, 45) for rotating the inking and doctor unit (3) about the axis of rotation (A) of the print cylinder (2), and
- first translatory actuating means (41) for translating the inking and doctor unit (3) in a first direction substantially perpendicular to the axis of rotation (A); and
- second translatory actuating means (4) for translating the inking and doctor unit (3) in a second direction substantially parallel to the axis of rotation (A).

The prior art does not disclose adjusting means between the doctor unit and the print cylinder and allowing all these movements to be achieved.

In view of the above, in the Applicant's opinion all the Claims of the present application comply with the patentability requirements under the PCT; a favorable international preliminary examination report is therefore respectfully solicited.

Very Truly Yours.

Daniele Cernuzzi



Encl.: pages 2-3; 15-19

Known rotogravure printing presses have various drawbacks. In particular, precisely on account of the high rotation speed of the print cylinder, part of the ink withdrawn during immersion inside the ink tank is spun off the cylinder surface and splashed onto surrounding components. Moreover, to leave enough room for the doctor and doctor carrier assembly, the ink tank cannot be located right next to the pressure roller, so that the inked portion of the print cylinder and the potential ink spin-off arc are fairly large. Ink splash obviously makes it necessary to clean all the components surrounding the print cylinder at the end of each printing cycle, especially when the type of ink being used is changed. And the cleaning work involved is a major handicap when making numerous short runs; in which case, overall downtime seriously affects efficiency in terms of utilization. Another drawback lies in the print cylinder remaining in contact with the surrounding air over the entire arc between the pressure roller and the ink tank, so that leftover ink not transferred to the strip material tends to dry and cake, thus preventing optimum inking of the cylinder surface, and seriously affecting printing quality.

A number of solutions are known (for example from US-A-4945832 and GB-A-604568) wherein the doctor and the doctor carrier assembly are closed in a box body facing the print cylinder; these solutions are however unsuitable to be used with print cylinder having different diameters, so requiring a replacement of the inking and doctor unit for operation with different size print cylinders.

DISCLOSURE OF THE INVENTION

It is an object of the present invention to provide an inking and doctor unit for a rotogravure print and spread assembly, designed to eliminate the aforementioned drawbacks.

According to the present invention, there is provided an inking and doctor unit for a rotogravure

print and spread assembly, as claimed in Claim 1. By virtue of the characteristics claimed, the inking unit according to the invention is closed to prevent ink splash during printing and/or spreading, and so effectively protect surrounding components and drastically reduce downtime of the press, which is mainly due to the cleaning work required between successive printing cycles. By reducing downtime, the overall efficiency, in terms of utilization, of a print assembly incorporating the inking and doctor unit according to the invention is therefore greatly increased, especially in the case of short runs. Moreover, reducing the parts to be cleaned has the ecological advantage of reducing the amount of sludge (wash products) requiring disposal. And, since the inking and doctor housing is closed, smaller ink tanks can be used, thus also reducing the amount of leftover ink which must be stored but is rarely reusable. Moreover, the unit according to the invention allows both the doctor position and the pressure exerted by the doctor to be accurately and effectively adjusted. The unit of the invention, by providing for both rotating and translating the doctor, allow both the doctoring position and angle to be adjusted, and so permit use of print cylinders having different developments i.e. diameters. The unit is accordingly suitable for operation with print cylinders having different diameters, without requiring substitution of other components.

Further advantages of the invention are claimed in the dependent Claims.

BRIEF DESCRIPTION OF THE DRAWINGS

A non-limiting embodiment of the invention will be described by way of example with reference to the accompanying drawings, in which:

Figure 1 shows a side view of a print assembly incorporating an inking unit in accordance with a first embodiment of the present invention;

CLAIMS

1) An inking and doctor unit (3) for a rotogravure print and spread cylinder, comprising a casing (13); a doctor assembly (14) including a doctor (24) fitted to a doctor carrier (25); and an inking chamber (15) bounded by a concave inner surface (13a) of the casing (13) and at least partly by the doctor assembly (14); the casing (13) and the doctor assembly (14) forming a box body (18) closed except for one side engaging in use a print cylinder (2); characterized in that the doctor (24) is mounted to lie flat with respect to a lateral surface (11) of the print cylinder (2), when the box body (18) engages the print cylinder (2); and in that the doctor carrier (25) comprises a rocking support (27) rotating about a regulating axis (C) parallel in use to an axis of rotation (A) of the print cylinder (2); and a slide (28) integral with the doctor (24) and which slides on the support (27).

2) A unit as claimed in Claim 1, characterized by comprising first sealing means (21, 21a, 22, 22a; 19a, 20a) for hermetic connection to the print cylinder (2).

3) A unit as claimed in Claim 2, characterized in that the first sealing means (21, 21a, 22, 22a) are flat-surface sealing means designed to engage opposite end surfaces (10) of the print cylinder (2).

4) A unit as claimed in Claim 3, characterized in that said first sealing means (21, 21a, 22, 22a) comprise

a first and a second plate (21, 22) fitted at opposite ends of the casing (13) and having respective sealing edges (21a, 22a) facing each other and arranged to slide on respective said end surfaces (10) when the box body
5 (18) engages the print cylinder (2).

5) A unit as claimed in Claim 4, characterized in that the first and second plate (21, 22) are movable with respect to the casing (13); and by comprising elastic means (21b, 22b; 50) associated with the first and second
10 plate (21, 22) to press the first and second plate (21, 22) against respective said end surfaces (10) when the box body (18) engages the print cylinder (2).

6) A unit as claimed in Claim 2, characterized in that the first sealing means (19a, 20a) are radial
15 sealing means shaped to engage the lateral surface (11) of the print cylinder (2).

7) A unit as claimed in Claim 6, characterized in that the first sealing means (19a, 20a) are carried by the casing (13), at opposite ends of the doctor assembly
20 (14), and comprise sealing edges (19a, 20a) of the casing (13) shaped to slide on the lateral surface (11) of the print cylinder (2) along at least a predetermined arc, when the box body (18) engages the print cylinder (2).

8) A unit as claimed in any one of the foregoing
25 Claims, characterized by comprising second sealing means (34, 35, 36) between the doctor assembly (14) and the casing (13).

9) A unit as claimed in Claim 8, characterized in

that the second sealing means (34, 35, 36) comprise seals (34, 35) located at opposite ends of the doctor assembly (14), flush with a first and second lateral wall (19, 20) respectively of the casing (13).

5 10) A unit as claimed in Claim 9, characterized in that the second sealing means (34, 35, 36) comprise pads (36) made of low-friction material, incorporated in the first and second lateral wall (19, 20) of the casing (13), and located at opposite ends of the doctor assembly (14); and pressure means (37, 38) for pressing the pads (36) against the opposite ends of the doctor assembly (14).

15 11) A unit as claimed in any one of the foregoing Claims, characterized by comprising third sealing means (32, 33) between a sealing surface (28a) of the doctor assembly (14) extending continuously along the whole width of the doctor assembly (14), and an edge (13b) of the casing (13) adjacent to the sealing surface (28a).

20 12) A unit as claimed in any one of the foregoing Claims, characterized in that the doctor (24) is fitted to the doctor carrier (25) for resting in use on the lateral surface (11) of the print cylinder (2) along a doctor line (R); the doctor (24) forming an acute angle with a plane tangent to the lateral surface (11) of the print cylinder (2) along the doctor line (R), on the ink
25 (12) feed side.

13) A unit as claimed in any one of the foregoing Claims, characterized by comprising actuating members

(30) for moving the slide (28) with respect to the support (27a; 13c).

14) A unit as claimed in any one of the foregoing Claims, characterized by comprising an inking roller (16) housed inside the inking chamber (15) with an axis (B) of rotation parallel to the axis of rotation (A) of the print cylinder (2) for pressing ink (12) collected inside the inking chamber (15) against the lateral surface (11) of the print cylinder (2).

15) A unit as claimed in any one of the foregoing Claims, characterized by comprising a hood (17) designed to define, in use, a wetting chamber (39) about a portion of the lateral surface (11) of the print cylinder (2) extending substantially between a print area (8) and the inking chamber (15).

16) A unit as claimed in Claim 15, characterized by comprising first and second feed means (6, 7) for feeding a wetting fluid and a cleaning fluid respectively into the hood (17).

17) A rotogravure print and spread assembly (1) comprising a print cylinder (2) having an axis of rotation (A); characterized by comprising an inking and doctor unit (3) as claimed in any one of Claims 1 to 16.

18) An assembly as claimed in Claim 17, characterized by comprising actuating means (4) for adjusting the relative position of the inking and doctor unit (3) with respect to the print cylinder (2).

19) An assembly as claimed in Claim 18,

characterized in that the actuating means (4) comprise rotary actuating means (40, 45) for rotating the inking and doctor unit (3) about the axis of rotation (A) of the print cylinder (2).

- 5 20) An assembly as claimed in Claim 18 or 19, characterized in that the actuating means (4) comprise first translatable actuating means (41) for translating the inking and doctor unit (3) in a first direction substantially perpendicular to the axis of rotation (A);
- 10 and second translatable actuating means (4) for translating the inking and doctor unit (3) in a second direction substantially parallel to the axis of rotation (A).